

Borehole

50-08-07**Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-108</u>	Site Number : <u>299-W10-133</u>
N-Coord : <u>43,397</u>	W-Coord : <u>75,761</u>	TOC Elevation : <u>671.93</u>
Water Level, ft : <u>118.3</u>	Date Drilled : <u>2/28/1974</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>120</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>120</u>	

Cement Bottom, ft. : 120 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-08-07 was drilled in February 1974 using a cable-tool drilling rig. The borehole was completed to a depth of 92 ft with 6-in. casing. In March 1981, the borehole was deepened to 120 ft and the 6-in. casing was perforated from the ground surface to 20 ft and 80 to 120 ft. A 4-in. casing was installed inside the original 6-in. casing and the annular space between the two casings was filled with 109 gal of grout.

An exact casing correction factor was not available to match the actual field conditions for this borehole. A 0.50-in.-thick casing correction factor was used to analyze the data, but a correction for the annular grout was not applied. Use of this casing correction factor will cause the radionuclide concentrations to be underestimated.

The top of the 4-in. casing, which is the zero reference for the SGLS, is approximately even with the ground surface.

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>04/29/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>5.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>2</u>	Log Run Date :	<u>05/04/1998</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>4.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>42.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>3</u>	Log Run Date :	<u>05/05/1998</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>42.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>90.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>4</u>	Log Run Date :	<u>05/06/1998</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>119.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>89.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>5</u>	Log Run Date :	<u>05/06/1998</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>80.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>67.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in five log runs. Log run five was a repeat log run performed for quality assurance purposes. Logging began on May 4, 1998 and was completed on May 6, 1998. The total logging depth achieved by the SGLS was 119 ft. Spectra were collected at intervals of 0.5 ft using a 200-s counting time.

At the time of logging, there was standing water in the borehole below 118.3 ft.

Analysis Information

Analyst : D.L. ParkerData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 07/30/1998**Analysis Notes :**

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the field verification spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra.

A casing correction factor for a 0.50-in.-thick casing was applied during processing because this correction most closely matched the double casing. A correction for the grout was not applied because that correction is not available.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides

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can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

The interval between 67 and 80 ft was relogged as an additional quality check and to demonstrate the repeatability of the radionuclide concentration measurements made by the SGLS. A comparison of the measured concentrations of the man-made and naturally occurring radionuclides using the data sets provided by the original and repeated logging runs is included. The measurements repeat within two standard deviations (95-percent confidence level), indicating excellent repeatability of the measured gamma-ray spectral peak intensities used to calculate the radionuclide assays.

A historical gross gamma time-sequence plot of selected gross gamma logs from 1975 to 1989 is included.

A plot of the average historical gross gamma activity recorded from 68 to 75 ft and 78 to 83 ft between 1975 and 1994 is also included.

Results/Interpretations:

The radionuclide concentrations identified are only apparent concentrations and should be considered underestimated.

The man-made radionuclides Cs-137 and Co-60 were detected with the SGLS in this borehole. The Cs-137 contamination was detected almost continuously from the ground surface to a depth of about 3 ft, at 101 ft, and almost continuously from 117 to 119 ft. The maximum Cs-137 concentration of about 1.9 pCi/g was measured at a depth of 1 ft.

Co-60 contamination was detected continuously from 69 to 95.5 ft, almost continuously from 103.5 to 105.5 ft, and at 108.5 and 110.5 ft. The maximum Co-60 concentration was recorded as 3.9 pCi/g at 72 ft.

The K-40 concentrations increase sharply between 38 and 53 ft and steadily increase between 53 and 90 ft. U-238 and Th-232 concentrations increase sharply at 72 ft and below 82 ft. The K-40 concentrations dramatically decrease at 95 and 104 ft; U-238 concentrations increase at 104 ft. K-40 and Th-232 concentrations increase below 112 ft.